

# LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

## Volume 5 | Technical Appendices

CFA17 | Offchurch and Cubbington  
**Data appendix (AQ-001-017)**  
Air quality

November 2013

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Department  
for Transport

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# Appendix AQ-001-017

Environmental topic:	Air Quality	AQ
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Community forum area:	Offchurch and Cubbington	017

# Contents

<b>Appendix AQ-001-017</b>	<b>i</b>
<b>1 Introduction</b>	<b>3</b>
<b>2 Policy framework</b>	<b>4</b>
<b>3 Baseline air quality data</b>	<b>6</b>
3.1 Existing air quality	6
3.2 Receptors	9
<b>4 Dust impact evaluation and risk rating</b>	<b>11</b>
<b>5 Air quality assessment – road traffic</b>	<b>19</b>
5.1 Overall assessment approach	19
5.2 Construction traffic model	19
5.3 Operational traffic model	21
<b>6 References</b>	<b>24</b>

## List of tables

Table 1: Annual mean pollutant concentrations recorded at continuous monitoring sites	7
Table 2: Number of hours when hourly average NO <sub>2</sub> concentrations exceed 200µg/m <sup>3</sup> at continuous monitoring sites	7
Table 3: Number of days when daily mean PM <sub>10</sub> concentrations exceed 50µg/m <sup>3</sup> at continuous monitoring sites	7
Table 4: Evaluation and risk rating of construction activities	11
Table 5: Summary of construction dust impacts and effects	18
Table 6: Modelled receptors (construction phase)	20
Table 7: Background 2017 concentrations at assessed receptors	20
Table 8: Summary of DMRB annual mean NO <sub>2</sub> results (construction phase)	20
Table 9: Summary of DMRB annual mean PM <sub>10</sub> results (construction phase)	20
Table 10: Modelled receptors (operational phase)	21
Table 11: Background 2026 concentrations at assessed receptors	22
Table 12: Summary of DMRB annual mean NO <sub>2</sub> results (operational phase)	22
Table 13: Summary of DMRB annual mean PM <sub>10</sub> results (operational phase)	22

# 1 Introduction

- 1.1.1 The air quality appendices for the Offchurch and Cubbington community forum area (CFA17) comprise:
- discussion of the policy framework (Section 2);
  - baseline air quality data (Section 3);
  - dust impact evaluation and risk rating (Section 4); and
  - air quality assessment – road traffic (Section 5).
- 1.1.2 Maps referred to throughout the air quality appendix are contained in the Volume 5 air quality Map Book.

## 2 Policy framework

- 2.1.1 Warwickshire County Council (WCC) works with the five district and borough councils (North Warwickshire Borough Council, Nuneaton and Bedworth Borough Council, Rugby Borough Council, Stratford-on-Avon District Council and Warwick District Council) within Warwickshire to address transport related air quality issues.
- 2.1.2 The WCC Local Transport Plan<sup>1</sup>, covering the period 2011-2026, includes an air quality strategy, which outlines a number of policies aimed at improving air quality across the county. The major themes of the air quality strategy are:
- to improve areas with poor air quality and maintain those areas that currently experience good air quality;
  - to encourage sustainable forms of transport, which reduce reliance on private vehicle use and minimises emissions to air; and
  - to promote awareness of alternative travel choices.
- 2.1.3 Policy AQA2 of the local transport plan air quality strategy, Improving Poor Air Quality through Partnership Working, is concerned with the preparation of air quality action plans (AQAP) and the implementation of traffic management improvements within air quality management areas (AQMA) and wider initiatives to change travel behaviour to encourage walking, cycling and the greater use of public transport.
- 2.1.4 Policy AQA3 of the local transport plan air quality strategy, Maintaining Areas of Good Air Quality, indicates that the lorry route map for Warwickshire will be reviewed every two to three years. This is potentially relevant to heavy duty vehicle (HDV) movements associated with the construction phase of the Proposed Scheme.
- 2.1.5 Policy AQ5 of the local transport plan air quality strategy, Integration of Air Quality and Transport Planning, states that WCC will provide input to the preparation of district and borough council local development frameworks and to individual planning applications to negotiate appropriate air quality and transport improvements.
- 2.1.6 Warwick District Council (WDC) is the local planning authority for all of the land within the Offchurch and Cubbington area. The relevant adopted local plan for the Offchurch and Cubbington area is therefore the Warwick District Local Plan 2007<sup>2</sup>.
- 2.1.7 The saved policies of the Warwick District Local Plan form the adopted policy for the purposes of development management. Objective 2F is "to protect and improve air quality"<sup>3</sup> and there are several policies that reflect this objective.
- 2.1.8 Policy DP9, of the Warwick District Local Plan, Pollution Control, is the principal policy of relevance to air quality. The policy expects development proposals to avoid giving rise to soil contamination, air, noise, radiation, light or water pollution where the levels of discharge or emissions would cause harm to sensitive receptors.

<sup>1</sup> Warwickshire County Council (2010/2011), *Warwickshire Local Transport Plan 2011-2026*.

<sup>2</sup> Warwick District Council (2007), *Warwick District Local Plan 1996-2011*.

<sup>3</sup> Warwick District Council (2007), *Warwick District Local Plan 1996-2011*. Core Strategy P27.

- 2.1.9 Policy DP2, of the Warwick District Local Plan, Amenity, is not specific in citing the causes of potential impacts on amenity, but states that development that would have an unacceptable impact on the amenity of nearby users and residents will not be permitted.
- 2.1.10 The WDC New Local Plan Preferred Options<sup>4</sup> was consulted upon from June to July 2012. The Council intends to submit the new local plan to the Secretary of State for examination in 2013. It is noted that the Proposed Scheme and its effects, were identified by WDC in its preferred options consultation as a key issue.
- 2.1.11 The preferred options set out the WDC's intentions for the future drafting of policy. In the latest version of the local plan, there are no policies specifically for air quality. Of indirect relevance is PO14, Transport, which expects that development proposals will mitigate against any negative transport impacts, including impacts on air quality.

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<sup>4</sup> Warwick District Council (2012), *Warwick District Council New Local Plan Preferred Options*.



## 3 Baseline air quality data

### 3.1 Existing air quality

#### Local authority review and assessment information

- 3.1.1 Under Part IV of the Environment Act 1995<sup>5</sup>, all local authorities are responsible for local air quality management (LAQM). Under the LAQM regime, a local authority is required to undertake regular review and assessment of local air quality, with the findings reviewed by the Department for Environment, Food and Rural Affairs (Defra) prior to publication.
- 3.1.2 If an area is identified as being unlikely to achieve an air quality standard and there are sensitive receptors to be exposed over the relevant exposure period, then the local authority is required to designate an AQMA and develop an AQAP to improve local air quality.
- 3.1.3 WDC has currently designated five AQMAs. Of these five AQMAs only the Leamington Spa AQMA is within the Offchurch and Cubbington area. This AQMA is 4km west of the centre line of the Proposed Scheme. The AQMA have been declared because nitrogen dioxide (NO<sub>2</sub>) concentrations exceed the annual mean air quality standard.
- 3.1.4 An AQAP<sup>6</sup> has been developed by WDC with the aim to improve local air quality in the designated AQMAs. The AQAP contains a number of predominantly transport-related actions to reduce vehicle-derived emissions, and includes the promotion of rail and other public transport measures to reduce emissions and improve local air quality conditions.

#### Local air quality monitoring data

- 3.1.5 Monitoring sites within the study area that are considered relevant for this assessment are shown in Volume 5: Map AQ-01-017. The following sections provide a summary of the recorded pollutant concentrations at these sites.
- 3.1.6 The pollutant concentrations can be compared to the air quality standards:
- 40µg/m<sup>3</sup> as an annual mean for NO<sub>2</sub> and PM<sub>10</sub>;
  - 200µg/m<sup>3</sup> one-hour mean for NO<sub>2</sub> not to be exceeded more than 18 times a year (equivalent to the 99.8<sup>th</sup> percentile of the one-hour mean);
  - 50µg/m<sup>3</sup> 24-hour mean for PM<sub>10</sub> not to be exceeded more than 35 times a year (equivalent to the 90.4<sup>th</sup> percentile of the 24-hour mean); and
  - 25µg/m<sup>3</sup> as an annual mean for PM<sub>2.5</sub>.

<sup>5</sup> *Environment Act 1995* (c.25). London, Her Majesty's Stationery Office.

<sup>6</sup> Warwick District Council (2008), *Warwick District Council Air Quality Action Plan 2008*.

### Continuous monitoring

- 3.1.7 This section summarises the results from the continuous monitoring sites that are considered relevant for the assessment of air quality in the Offchurch and Cubbington area.
- 3.1.8 There is one continuous air quality monitoring site within the Offchurch and Cubbington area. This site is located at Hamilton Terrace in Leamington Spa, 4.2 km west of the centre line of the Proposed Scheme.
- 3.1.9 The continuous monitoring site at Hamilton Terrace is part of the automatic urban and rural Network (AURN)<sup>7</sup> operated in association with Defra and is classified as an urban background site. The pollutants measured include nitrogen dioxide (NO<sub>2</sub>) and particulate matter (PM<sub>10</sub>).
- 3.1.10 Annual mean data for NO<sub>2</sub> and PM<sub>10</sub> for this site is presented in Table 1. Hourly mean data for NO<sub>2</sub> are presented in Table 2. Daily mean data for PM<sub>10</sub> are presented in Table 3.

Table 1: Annual mean pollutant concentrations recorded at continuous monitoring sites<sup>8</sup>

Pollutant	Annual mean concentrations (µg/m <sup>3</sup> )				
	2008	2009	2010	2011	2012
<b>WDC: Hamilton Terrace, Leamington Spa (grid reference 431943, 265730)</b>					
NO <sub>2</sub>	27	27	28	21	21
PM <sub>10</sub>	15 <sup>a</sup>	20 <sup>b</sup>	21 <sup>b</sup>	20 <sup>b</sup>	26 <sup>b</sup>

Table 2: Number of hours when hourly average NO<sub>2</sub> concentrations exceed 200µg/m<sup>3</sup> at continuous monitoring sites<sup>9</sup>

Site	Number of exceedances of hourly mean NO <sub>2</sub> standard				
	2008	2009	2010	2011	2012
WDC: Hamilton Terrace	0 (101) <sup>a</sup>	0	0	0	0

Source: Warwick District Council (2013), *Warwick 2013 Progress Report*.

Air quality standard for NO<sub>2</sub> allows for no more than 18 exceedences of 200µg/m<sup>3</sup>, expressed as an hourly mean.

<sup>a</sup> 99.8<sup>th</sup> percentile of hourly average NO<sub>2</sub> concentrations (in brackets where available).

Table 3: Number of days when daily mean PM<sub>10</sub> concentrations exceed 50µg/m<sup>3</sup> at continuous monitoring sites<sup>10</sup>

Site	Number of exceedances of daily mean PM <sub>10</sub> standard				
	2008	2009	2010	2011	2012
WDC: Hamilton Terrace	3 <sup>a</sup> (25.3) <sup>b</sup>	9 <sup>c</sup>	2 <sup>c</sup>	13 <sup>c</sup>	4 <sup>c</sup>

<sup>7</sup> Defra; Automatic Urban and Rural Network (AURN); <http://uk-air.defra.gov.uk/networks/network-info?view=aurn>; Accessed: July 2013.

<sup>8</sup> Source: Warwick District Council (2013), *Warwick 2013 Progress Report*. Notes for Table 1: Air quality standard for NO<sub>2</sub> and PM<sub>10</sub> is 40µg/m<sup>3</sup> expressed as an annual mean. <sup>a</sup> Measured using Tapered Element Oscillating Microbalance (TEOM) method corrected to gravimetric equivalent using Volatile Correction Model. <sup>b</sup> Measured using a Filter Dynamic Measurement System (FDMS) equipment to undertake gravimetric monitoring of airborne particulate concentrations

<sup>9</sup> Source: Warwick District Council (2013), *Warwick 2013 Progress Report*. Notes for Table 2: Air quality standard for NO<sub>2</sub> allows for no more than 18 exceedences of 200µg/m<sup>3</sup>, expressed as an hourly mean. <sup>a</sup> 99.8<sup>th</sup> percentile of hourly average NO<sub>2</sub> concentrations (in brackets where available).

<sup>10</sup> Source: Warwick District Council (2013), *Warwick 2013 Progress Report*. Notes for Table 3: Air quality standard for PM<sub>10</sub> allows for no more than 35 exceedences of 50µg/m<sup>3</sup>, expressed as a daily mean. <sup>a</sup> Measured using Tapered Element Oscillating Microbalance (TEOM) method corrected to gravimetric equivalent using Volatile Correction Model. <sup>b</sup> 90<sup>th</sup> percentile of daily mean PM<sub>10</sub> concentrations (in brackets where available). <sup>c</sup> Measured using a Filter Dynamic Measurement System (FDMS) equipment to undertake gravimetric monitoring of airborne particulate concentrations

- 3.1.11 NO<sub>2</sub> concentrations are below the relevant air quality standards. There is no clear increasing or decreasing trend in monitored annual mean or hourly NO<sub>2</sub> concentrations over the 2008-2012 period.
- 3.1.12 The number of exceedances of the hourly mean air quality standard displays a similar pattern. There is no clear increasing or decreasing trend in concentrations over the 2008-2012 period.
- 3.1.13 The PM<sub>10</sub> measurements made at the Hamilton Terrace site are considerably below the relevant air quality standards for particulate matter. There is no clear increasing or decreasing trend in monitored concentrations over the 2008-2012 period.
- 3.1.14 The area through which the Proposed Scheme passes is considerably less developed and on this basis concentrations of NO<sub>2</sub> and particulate matter near the Proposed Scheme are expected to be below the relevant air quality standards.

### Diffusion tubes

- 3.1.15 WDC also measures annual mean NO<sub>2</sub> concentrations using a network of 57 passive diffusion tubes located across its administrative area. There are a number of monitoring sites in Leamington Spa, but these are all at roadside sites in the town centre and not considered relevant for this assessment.

### Background pollutant concentrations

- 3.1.16 Estimates of background air quality have been obtained from Defra for 2011 and future years (2017 and 2026)<sup>11</sup>. These data are estimated for 1km grid squares for nitrogen oxides (NO<sub>x</sub>), NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>. NO<sub>2</sub> annual mean concentrations ranged from 11µg/m<sup>3</sup> to 13µg/m<sup>3</sup> in 2012, PM<sub>10</sub> annual mean concentrations ranged from 15µg/m<sup>3</sup> to 16µg/m<sup>3</sup> in 2012 and PM<sub>2.5</sub> annual mean concentrations ranged from 10µg/m<sup>3</sup> to 11µg/m<sup>3</sup> in 2012. Average background pollutant concentrations are below the relevant air quality standards.
- 3.1.17 While the continuous monitoring site can be used to indicate trends in concentrations, it is not considered to be representative of the predominantly rural area through which the Proposed Scheme will pass within the Offchurch and Cubbington area. On this basis the Defra background concentrations maps have been used to characterise the baseline air quality for the Offchurch and Cubbington area. These maps indicate the average background pollutant concentrations across the Offchurch and Cubbington area are less than the relevant air quality standards.

### Local emission sources

- 3.1.18 The main source of emissions of NO<sub>x</sub> and PM<sub>10</sub> in the Offchurch and Cubbington area is road traffic emissions<sup>12</sup> from the A445 Leicester Lane and B4455 Fosse Way which will cross the Proposed Scheme within the Offchurch and Cubbington area. There are

<sup>11</sup> Department for Environment, Food and Rural Affairs; Background Maps; <http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html>; Accessed: July 2013.

<sup>12</sup> Warwick District Council (2013), *Warwick 2013 Progress Report*.

no industrial installations, permitted as part A processes<sup>13</sup>, within the Offchurch and Cubbington area.

## 3.2 Receptors

### Human

- 3.2.1 Human receptors which are considered to be susceptible to changes in air quality due to construction and operation of the proposed scheme have been identified.

### Construction phase

- 3.2.2 Human receptors that could potentially be affected by the construction phase of the Proposed Scheme are shown in Volume 5: Map AQ-02-017-01, Map AQ-02-017-02 and Map AQ-02-017-03, for receptors relevant to the construction dust assessment and Volume 5: Map AQ-01-017 for receptors relevant to the construction traffic emissions assessment. These include:

- property along Welsh Road, Offchurch, south of the B4455 Fosse Way;
- properties along the B4455 Fosse Way, Offchurch;
- properties along Long Itchington Road, Offchurch;
- properties at the junction of Welsh Road and Hunningham Road, Offchurch;
- Valley Fields, Hunningham Road, Offchurch;
- property at Lower Grange Farm, Mill Lane, Cubbington;
- properties along the B4453 Rugby Road, Cubbington; and
- Oakdene, A429 Coventry Road, Cubbington.

### Operational phase

- 3.2.3 Human receptors that could potentially be affected by the operation of the Proposed Scheme are shown in Volume 5: Map AQ-01-017. These include:

- properties along the B4455 Fosse Way;
- Valley Fields, Hunningham Road, Offchurch; and
- properties along the B4453 Rugby Road, Cubbington.

### Ecological

### Construction phase

- 3.2.4 There are no ecological receptors with statutory designations within the Offchurch and Cubbington area. There is one non-statutory designated site within the Offchurch and Cubbington area that could potentially be affected by changes in air quality as a result of the Proposed Scheme. This site is South Cubbington Wood Local Wildlife Site (LWS). This site is located south of B4453 Rugby Road.

<sup>13</sup> Identified from Environment Agency; What's in your backyard website; <http://www.environment-agency.gov.uk/default.aspx>; accessed July 2013. A Part A process is an industrial operation requiring a permit to operate from the Environment Agency under the Environmental Permitting regime, and as such is considered a significant source of pollution.

*Operational phase*

- 3.2.5 No ecological receptors with a statutory designation or non-statutory designation that could potentially be affected by the operation of the Proposed Scheme have been identified within the Offchurch and Cubbington area.

## 4 Dust impact evaluation and risk rating

- 4.1.1 The following tables provide details of the assessment of construction impacts following the Institute of Air Quality Management (IAQM) guidance<sup>14</sup>. Where considered useful to identify receptors and their relationship to the construction activity, a specific figure is provided.
- 4.1.2 The construction activities considered were the construction of new structures; earthworks, including the movement of materials on the haul road along the line of the Proposed Scheme; and dust and mud deposited onto public highways from vehicles travelling to and from construction areas (referred to as trackout in the IAQM guidance).

Table 4: Evaluation and risk rating of construction activities

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
<b>Properties along Welsh Road, Offchurch, south of Fosse Way (Volume 5: Map AQ-02-017-01 Figure 17.1)</b>						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m
Earthworks	20m-50m	Large	High	Low	Negligible	Properties more than 20m from earthworks and more than 100m from haul road  Total area of earthworks greater than 10,000m <sup>2</sup>  More than 10 heavy earth moving vehicles on haul road per day  Baseline PM <sub>10</sub> concentrations less than 75% of air quality standard  Duration of earthworks expected to be more than 12 months
Construction	20m-50m	Large	High	Low	Negligible	Properties more than 20m from construction  Total volume of construction greater than 100,000m <sup>3</sup>  Baseline PM <sub>10</sub> concentrations less than 75% of air quality standard  Duration of construction expected to be more than 12 months

<sup>14</sup> IAQM (2012), *Guidance on the assessment of the impacts of construction on air quality and the determination of their significance*.

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
Trackout	Less than 20m	Medium	Medium	High	Negligible	Properties 9m from trackout route  25-100 HDV trips per day  Baseline PM <sub>10</sub> concentrations less than 75% of air quality standard  Duration of trackout expected to be more than 12 months
<b>Properties along B4455 Fosse Way, Offchurch (Volume 5: Map AQ-02-017-01 Figure 17.2)</b>						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m
Earthworks	20m-50m	Large	High	Low	Negligible	Properties more than 20m from earthworks and more than 100m from haul road  Total area of earthworks greater than 10,000m <sup>2</sup>  More than 10 heavy earth moving vehicles on haul road per day  Baseline PM <sub>10</sub> concentrations less than 75% of air quality standard  Duration of earthworks expected to be more than 12 months
Construction	20m-50m	Large	High	Low	Negligible	Properties more than 20m from construction  Total volume of construction greater than 100,000m <sup>3</sup>  Baseline PM <sub>10</sub> concentrations less than 75% of air quality standard  Duration of construction expected to be more than 12 months
Trackout	20m-50m	Large	Medium	Low	Negligible	Properties more than 20m from trackout  Over 100 HDV trips per day  Baseline PM <sub>10</sub> concentrations less than 75% of air quality standard  Duration of trackout expected to be more than 12 months
<b>Properties along Long Itchington Road, Offchurch (Volume 5: Map AQ-02-017-01 Figure 17.3)</b>						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
Earthworks	50m-100m	Large	Medium	Low	Negligible	Properties more than 50m from earthworks and haul road Total site area of earthworks greater than 10,000m <sup>2</sup> More than 10 heavy earth moving vehicles on haul road per day Baseline PM <sub>10</sub> concentrations less than 75% of air quality standard Duration of earthworks expected to be more than 12 months
Construction	100m-200m	Large	Medium	Low	Negligible	Properties more than 20m from construction Total volume of construction greater than 100,000m <sup>3</sup> Baseline PM <sub>10</sub> concentrations less than 75% of air quality standard Duration of construction expected to be greater than 12 months
Trackout	n/a	n/a	n/a	n/a	n/a	No trackout route within 100m
<b>Properties at the junction of Welsh Road and Hunningham Road, Offchurch (Volume 5: Map AQ-02-017-01 Figure 17.4)</b>						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m
Earthworks	n/a	n/a	n/a	n/a	n/a	No earthworks or haul road within 350m
Construction	n/a	n/a	n/a	n/a	n/a	No construction within 350m
Trackout	Less than 20m	Medium	Medium	High	Negligible	Properties 9m from trackout route 25-100 HDV trips per day Baseline PM <sub>10</sub> concentrations less than 75% of air quality standard Duration of trackout expected to be more than 12 months
<b>Valley Fields, Hunningham Road, Offchurch (Volume 5: Map AQ-02-017-02 Figure 17.5)</b>						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m



Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
Earthworks	20m-50m	Large	Medium	Low	Negligible	Property more than 20m from earthworks and more than 100m from haul road  Total area of earthworks greater than 10,000m <sup>2</sup>  More than 10 heavy earth moving vehicles on haul road per day  Baseline PM <sub>10</sub> concentrations less than 75% of air quality standard  Duration of earthworks expected to be more than 12 months
Construction	20m-50m	Large	High	Low	Negligible	Property more than 20m of construction  Total building volume of construction greater than 100,000m <sup>3</sup>  Baseline PM <sub>10</sub> concentrations less than 75% of air quality standard  Duration of construction expected to be more than 12 months
Trackout	20m-50m	Medium	Medium	Low	Negligible	Property more than 20m from trackout route  25-100 HDV trips per day  Baseline PM <sub>10</sub> concentrations less than 75% of air quality standard  Duration of trackout expected to be more than 12 months
<b>Property at Lower Grange Farm, Mill Lane, Cubbington (Volume 5: Map AQ-02-017-02 Figure 17.6)</b>						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m
Earthworks	n/a	n/a	n/a	n/a	n/a	No earthworks or haul road within 350m
Construction	20m-50m	Large	High	Low	Negligible	Property more than 20m from construction  Total volume of construction greater than 100,000m <sup>3</sup>  Baseline PM <sub>10</sub> concentrations less than 75% of air quality standard  Duration of construction expected to be more than 12 months
Trackout	n/a	n/a	n/a	n/a	n/a	No trackout route within 100m

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
<b>Properties along B4453 Rugby Road, Cubbington (Volume 5: Map AQ-02-017-02 Figure 17.7 and Figure 17.8)</b>						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m
Earthworks	50m-100m	Large	Medium	Low	Negligible	<p>Properties more than 50m from earthworks and more than 100m from haul road</p> <p>Total area of earthworks greater than 10,000m<sup>2</sup></p> <p>More than 10 heavy earth moving vehicles on haul road per day</p> <p>Baseline PM<sub>10</sub> concentrations less than 75% of air quality standard</p> <p>Duration of earthworks expected to be more than 12 months</p>
Construction	20m-50m	Large	High	Low	Negligible	<p>Properties more than 20m from construction</p> <p>Total volume of construction greater than 100,000m<sup>3</sup></p> <p>Baseline PM<sub>10</sub> concentrations less than 75% of air quality standard</p> <p>Duration of construction expected to be more than 12 months</p>
Trackout	20m-50m	Medium	Medium	Low	Negligible	<p>Properties more than 20m from trackout</p> <p>25-100 HDV trips per day</p> <p>Baseline PM<sub>10</sub> concentrations less than 75% of air quality standard</p> <p>Duration of trackout expected to be more than 12 months</p>
<b>Oakdene, A429 Coventry Road, Cubbington (Volume 5: Map AQ-02-017-03 Figure 17.9)</b>						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
Earthworks	100m-200m	Large	Medium	Low	Negligible	<p>Properties more than 100m of earthworks and more than 300m from haul road</p> <p>Total area of earthworks greater than 10,000m<sup>2</sup></p> <p>More than 10 heavy earth moving vehicles on haul road per day</p> <p>Baseline PM<sub>10</sub> concentrations less than 75% of air quality standard</p> <p>Duration of earthworks expected to be more than 12 months</p>
Construction	100m-200m	Large	Medium	Low	Negligible	<p>Properties more than 100m of construction</p> <p>Total volume of construction greater than 100,000m<sup>3</sup></p> <p>Baseline PM<sub>10</sub> concentrations less than 75% of air quality standard</p> <p>Duration of construction expected to be more than 12 months</p>
Trackout	50m-100m	Medium	Low	Low	Negligible	<p>Properties more than 20m from trackout route</p> <p>25-100 HDV (&gt;3.5 tonne) trips in any one day</p> <p>Baseline PM<sub>10</sub> concentrations less than 75% of air quality standard</p> <p>Duration of trackout expected to be more than 12 months</p>
<b>South Cubbington Wood LWS</b>						
Demolition	n/a	n/a	n/a	n/a	n/a	No demolition within 350m
Earthworks	Less than 20m	Large	Medium	Medium	Negligible	<p>Locally important ecological site</p> <p>Ecological receptor less than 20m from earthworks and haul road</p> <p>Total site area of earthworks greater than 10,000m<sup>2</sup></p> <p>More than 10 heavy earth moving vehicles on haul road per day</p> <p>Baseline PM<sub>10</sub> concentrations less than 75% of air quality standard</p> <p>Duration of earthworks expected more than 12 months</p>

Activity	Distance to nearest receptor	Dust emission class	Dust risk category	Sensitivity of surrounding area	Magnitude of impact (with CoCP mitigation measures)	Principal justifications
Construction	Less than 20m	Large	Medium	Medium	Negligible	<p>Locally important ecological site</p> <p>Ecological receptor less than 20m from construction</p> <p>Total site area of earthworks greater than 100,000m<sup>3</sup></p> <p>Baseline PM<sub>10</sub> concentrations less than 75% of air quality standard</p> <p>Duration of earthworks expected more than 12 months</p>
Trackout	Less than 20m	Medium	Medium	Medium	Negligible	<p>Locally important ecological site</p> <p>Ecological receptor less than 20m from trackout route</p> <p>25-100 HDV trips per day</p> <p>Baseline PM<sub>10</sub> concentrations less than 75% of air quality standard</p> <p>Duration of trackout expected to be more than 12 months</p>

Table 5: Summary of construction dust impacts and effects

Location	Magnitude of impact (with CoCP mitigation measures)	Effect of dust-generating activities	Additional mitigation
Property along Welsh Road, Offchurch, south of B4455 Fosse Way	Negligible	Not significant	None required
Properties along B4455 Fosse Way, Offchurch	Negligible	Not significant	None required
Properties along Long Itchington Road, Offchurch	Negligible	Not significant	None required
Properties at the junction of Welsh Road and Hunningham Road, Offchurch	Negligible	Not significant	None required
Valley Fields, Hunningham Road, Offchurch	Negligible	Not significant	None required
Property at Lower Grange Farm, Mill Lane, Cubbington	Negligible	Not significant	None required
Properties along B4453 Rugby Road, Cubbington	Negligible	Not significant	None required
Oakdene, A429 Coventry Road, Cubbington	Negligible	Not significant	None required
South Cubbington Wood LWS	Negligible	Not significant	None required

## 5 Air quality assessment – road traffic

### 5.1 Overall assessment approach

- 5.1.1 The air quality assessment for road related emissions has used three different approaches based on the scale of changes in traffic and road alignment. Where the Design Manual for Roads and Bridges<sup>15</sup> (DMRB) thresholds detailed in the SMR (Volume 5: Appendix CT-001-000/1) will not be exceeded, any additional assessment is not required as the air quality impacts will be minimal. If these thresholds are breached, then an assessment has been carried out.
- 5.1.2 If it is considered unlikely that air quality standards will be exceeded and the road configuration is a simple one, then the DMRB screening method has been used to predict changes in air quality. Where there will be a risk of standards being exceeded, where the road layout is considered to be complex or where the use of the DMRB screening method has indicated that there will be a potential exceedance of air quality standards, then the atmospheric dispersion model ADMS-Roads has been used for the assessment. Professional judgment has been used to select the appropriate tool for each area.
- 5.1.3 In this study area the DMRB screening method was considered to be a suitable tool for the assessment, as baseline air quality will be below air quality standards, there is a simple road layout and there are limited numbers of receptors close to roads affected during construction and operation of the Proposed Scheme.

### 5.2 Construction traffic model

- 5.2.1 Construction traffic data used in this assessment are detailed in Volume 5: Appendix TR-001-000. The construction scenario used traffic data from the year of maximum intensity of construction (2021) but assumed this would occur in the first year of construction (2017).
- 5.2.2 Screening using the DMRB traffic and road alignment change criteria was undertaken to determine locations requiring assessment. Two locations within the Offchurch and Cubbington area met the criteria for assessment of change in traffic emissions during the construction phase. These locations were the B4455 Fosse Way, between Welsh Road and the A425 Southam Road; and Long Itchington Road, Offchurch. The increase in construction traffic was sufficient to require an assessment for these roads. No locations were identified as requiring assessment due to construction traffic movements on the haul road.

#### Receptors assessed

- 5.2.3 For locations where DMRB traffic and road alignment change criteria for local air quality were met, a number of receptors representative of worst-case exposure locations were selected for quantitative assessment. These included locations representative of highest concentrations along the roads, including closest to junctions or to the road itself. Receptors assessed are listed in Table 6 and shown in Volume 5: Map AQ-01-017.

<sup>15</sup> Highways Agency (2007), *The Design Manual for Roads and Bridges (Volume 11, Section 3, Part 1 Air Quality HA207/07)*.

Table 6: Modelled receptors (construction phase)

Receptor	Description/Location	Ordnance Survey coordinates
17-1	1 Railway Bridge Cottages, Long Itchington Road, Offchurch	436494, 265562

## Background concentrations

- 5.2.4 The background concentrations used in the assessment are shown in Table 7 taken from the Defra Maps.

Table 7: Background 2017 concentrations at assessed receptors

Receptor (or zone of receptors)	Concentrations ( $\mu\text{g}/\text{m}^3$ )		
	NO <sub>x</sub>	NO <sub>2</sub>	PM <sub>10</sub>
17-1 (1 Railway Bridge Cottages)	13.7	10.1	15.0

## DMRB model results

- 5.2.5 This section provides the summary of the modelled pollutant concentrations for the assessed receptors. The magnitude of change and impact descriptor is also derived following the Environmental Protection UK (EPUK) methodology<sup>16</sup>.

Table 8: Summary of DMRB annual mean NO<sub>2</sub> results (construction phase)

Receptor	Concentrations ( $\mu\text{g}/\text{m}^3$ )			Change in concentrations ( $\mu\text{g}/\text{m}^3$ )	Magnitude of change	Impact descriptor
	2012 baseline	2017 without Proposed Scheme	2017 with Proposed Scheme			
17-1 (1 Railway Bridge Cottages)	12.3	10.2	10.3	0.1	Imperceptible	Negligible

Table 9: Summary of DMRB annual mean PM<sub>10</sub> results (construction phase)

Receptor	Concentrations ( $\mu\text{g}/\text{m}^3$ )			Change in concentrations ( $\mu\text{g}/\text{m}^3$ )	Magnitude of change	Impact descriptor
	2012 baseline	2017 without Proposed Scheme	2017 with Proposed Scheme			
17-1 (1 Railway Bridge Cottages)	15.8	15.0	15.0	0.0	Imperceptible	Negligible

- 5.2.6 Annual mean NO<sub>2</sub> and PM<sub>10</sub> concentrations will be below the air quality standards both with and without the Proposed Scheme for the construction phase. The hourly mean NO<sub>2</sub> air quality standard will also be met as annual mean NO<sub>2</sub> concentrations will be well below 60 $\mu\text{g}/\text{m}^3$ . In addition the daily mean PM<sub>10</sub> air quality standard will also be met. It is not possible to model PM<sub>2.5</sub> using the DMRB screening model, but given the PM<sub>10</sub> concentrations, the annual mean PM<sub>2.5</sub> concentrations will be below the air quality standard.
- 5.2.7 Changes in modelled concentrations with and without the Proposed Scheme have been calculated to determine the impact to local air quality. The change in NO<sub>2</sub> and PM<sub>10</sub> concentrations is imperceptible. The magnitude of impact will be negligible at the receptor for NO<sub>2</sub> and PM<sub>10</sub>.

<sup>16</sup> Environmental Protection UK (EPUK) (2010), *Development Control: Planning for Air Quality*.

- 5.2.8 In certain instances additional qualitative assessment has been undertaken. This was the case for the A425 between Welsh Road and the A425 Southam Road, which was identified as meeting the criteria for assessment due to an increase in construction traffic. The qualitative assessment concluded that the magnitude of impact for NO<sub>2</sub> and PM<sub>10</sub> is expected to be negligible at receptors along these roads. The expected magnitude of impact has been determined on the basis of the magnitude of construction traffic increases, the baseline air quality is below air quality standards, the distance to the receptors from the roads and the existing traffic flows on the construction traffic routes.

### Assessment of significance

- 5.2.9 Considering the significance of the air quality impacts according to the criteria set in the EPUK methodology<sup>16</sup>, the following points are noted:
- the magnitude of impact is negligible for NO<sub>2</sub> and PM<sub>10</sub> at the receptor;
  - pollutant concentrations are well below the air quality standards for both NO<sub>2</sub> and PM<sub>10</sub> with and without the Proposed Scheme.
- 5.2.10 Based on the above, the effect on air quality due to construction traffic emission will not be significant

## 5.3 Operational traffic model

- 5.3.1 Operational traffic data used in this assessment are detailed in Volume 5: Appendix TR-001-000. The operational scenario used traffic data from the first year of opening of the Proposed Scheme (2026).
- 5.3.2 Screening using the DMRB traffic and road alignment change criteria was undertaken to determine locations requiring assessment. Three locations within the Offchurch and Cubbington area met the criteria for assessment of emissions from traffic during the operational stage, following completion of the Proposed Scheme. These locations were on the B4455 Fosse Way, Offchurch; on Hunningham Road, Offchurch and on the B4453 Rugby Road, Cubbington. There will be permanent road realignments at all these locations which required assessment of changes in concentrations at receptors around these roads.

### Receptors assessed

- 5.3.3 For locations where DMRB traffic and road alignment change criteria for local air quality were met, a number of receptors representative of worst-case exposure locations were selected for quantitative assessment. These included locations representative of highest concentrations along the roads, including closest to junctions or to the road itself. Receptors assessed are listed in Table 10 and shown in Volume 5: Map AQ-01-017.

Table 10: Modelled receptors (operational phase)

Receptor	Description/Location	Ordnance Survey coordinates
17-2	1 Spring Hill Cottages, B4455 Fosse Way, Offchurch	437101,265230
17-3	1 Burnt Heath Cottages, Long Itchington Road, Offchurch (adjacent to the B4455 Fosse Way)	437502,265594



Receptor	Description/Location	Ordnance Survey coordinates
17-4	Valley Fields, Hunningham Road, Offchurch	436409,266265
17-5	Wychewood, B4453 Rugby Road, Cubbington	435115,269016
17-6	Lone Wood, B4453 Rugby Road, Cubbington	435148,269057

## Background concentrations

5.3.4 The background concentrations used in the assessment are shown in Table 11 taken from the Defra maps.

Table 11: Background 2026 concentrations at assessed receptors

Receptor (or zone of receptors)	Concentrations ( $\mu\text{g}/\text{m}^3$ )		
	NO <sub>x</sub>	NO <sub>2</sub>	PM <sub>10</sub>
17-2 (1 Spring Hill Cottages)	10.4	7.9	13.9
17-3 (1 Burnt Heath Cottages)	10.4	7.9	13.9
17-4 (Valley Fields)	10.8	8.2	14.5
17-5 (Wychewood)	11.5	8.6	14.2
17-6 (Lone Wood)	11.5	8.6	14.2

## DMRB model results

5.3.5 This section provides the summary of the modelled pollutant concentrations for the assessed receptors. The magnitude of change and impact descriptor is also derived following the EPUK methodology<sup>16</sup>.

Table 12: Summary of DMRB annual mean NO<sub>2</sub> results (operational phase)

Receptor	Concentrations ( $\mu\text{g}/\text{m}^3$ )		Change in concentrations ( $\mu\text{g}/\text{m}^3$ )	Magnitude of change	Impact descriptor
	2026 without Proposed Scheme	2026 with Proposed Scheme			
17-2 (1 Spring Hill Cottages)	9.7	8.6	-1.1	Small decrease	Negligible
17-3 (1 Burnt Heath Cottages)	8.0	8.0	0.0	Imperceptible	Negligible
17-4 (Valley Fields)	8.2	8.2	0.0	Imperceptible	Negligible
17-5 (Wychewood)	9.3	9.3	0.0	Imperceptible	Negligible
17-6 (Lone Wood)	9.3	9.3	0.0	Imperceptible	Negligible

Table 13: Summary of DMRB annual mean PM<sub>10</sub> results (operational phase)

Receptor	Concentrations ( $\mu\text{g}/\text{m}^3$ )		Change in concentrations ( $\mu\text{g}/\text{m}^3$ )	Magnitude of change	Impact descriptor
	2026 without Proposed Scheme	2026 with Proposed Scheme			
17-2 (1 Spring Hill Cottages)	14.3	14.1	-0.2	Imperceptible	Negligible
17-3 (1 Burnt Heath Cottages)	14.0	14.0	0.0	Imperceptible	Negligible
17-4 (Valley Fields)	14.6	14.6	0.0	Imperceptible	Negligible

Receptor	Concentrations ( $\mu\text{g}/\text{m}^3$ )		Change in concentrations ( $\mu\text{g}/\text{m}^3$ )	Magnitude of change	Impact descriptor
	2026 without Proposed Scheme	2026 with Proposed Scheme			
17-5 (Wychewood)	14.3	14.3	0.0	Imperceptible	Negligible
17-6 (Lone Wood)	14.3	14.3	0.0	Imperceptible	Negligible

5.3.6 Annual mean NO<sub>2</sub> and PM<sub>10</sub> concentrations will be below the air quality standards both with and without the Proposed Scheme for the operation phase. The hourly mean NO<sub>2</sub> air quality standard will also be met as annual mean NO<sub>2</sub> concentrations will be well below 60 $\mu\text{g}/\text{m}^3$ . In addition the daily mean PM<sub>10</sub> air quality standard will also be met. It is not possible to model PM<sub>2.5</sub> using the DMRB screening model, but given the PM<sub>10</sub> concentrations, the annual mean PM<sub>2.5</sub> concentrations will be below the air quality standard.

5.3.7 Changes in modelled concentrations with and without the Proposed Scheme have been calculated to determine the impact to local air quality. There is a small decrease in NO<sub>2</sub> concentrations at one receptor due to the realignment of the B4455 Fosse Way further away from this receptor. At other modelled receptors the change in NO<sub>2</sub> is imperceptible. The change in PM<sub>10</sub> concentrations is imperceptible at all receptors.

5.3.8 The magnitude of impact will be negligible at all receptors for NO<sub>2</sub> and PM<sub>10</sub>.

### Assessment of significance

5.3.9 Considering the significance of the air quality impacts according to the criteria set in the EPUK methodology<sup>16</sup>, the following points are noted:

- the magnitude of impact is negligible for NO<sub>2</sub> and PM<sub>10</sub> at all receptors;
- pollutant concentrations are well below the air quality standards for both NO<sub>2</sub> and PM<sub>10</sub> with and without the Proposed Scheme.

5.3.10 Based on the above, the effect on air quality due to operational traffic emissions will not be significant.

## 6 References

Defra; Automatic Urban and Rural Network (AURN); <http://uk-air.defra.gov.uk/networks/network-info?view=aurn>; Accessed: July 2013.

Defra; Background Maps; <http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html>; Accessed: July 2013.

*Environment Act 1995* (c.25). London, Her Majesty's Stationery Office.

Environment Agency; What's in your backyard website; <http://www.environmentagency.gov.uk/default.aspx>; accessed July 2013.

Environmental Protection UK (EPUK) (2010), *Development Control: Planning for Air Quality*.

Highways Agency (2007), *The Design Manual for Roads and Bridges* (Volume 11, Section 3, Part 1 Air Quality HA207/07).

IAQM (2012), *Guidance on the assessment of the impacts of construction on air quality and the determination of their significance*.

Warwick District Council (2007), *Warwick District Local Plan 1996-2011*.

Warwick District Council (2008), *Warwick District Council Air Quality Action Plan 2008*.

Warwick District Council (2012), *Warwick District Council New Local Plan Preferred Options*.

Warwick District Council (2013), *Warwick 2013 Progress Report*.

Warwickshire County Council (2010/2011), *Warwickshire Local Transport Plan 2011-2026*.